

CLAIMS

1. A surgical access device, comprising:

an elongate tubular member having a working channel and an axis extending between a proximal end and a distal end;

5 a septum seal integrally formed at the distal end of the tubular member; and

a zero seal disposed at the distal end of the tubular member and distal to the septum seal, the zero seal being sized and configured to seal when no instrument is in place within the working channel of the tubular member, and the zero seal being coupled to the septum seal and having properties to float with the septum seal relative to the tubular member.

2. The surgical access device of claim 1, wherein the tubular member is formed from an elastomeric material.

3. The surgical access device of claim 1, wherein the zero seal is a duckbill seal constructed with an intersecting sealing portion.

4. The surgical access device of claim 1, wherein the zero seal is a double duckbill seal constructed with two or more intersecting sealing portions

5. The surgical access device of claim 1, further comprising a retaining portion at the proximal end of the tubular member.

6. The surgical access device of claim 5, wherein the retaining portion is a flange or a ring.

7. The surgical access device of claim 1, wherein the tubular member and the septum seal are molded together as a single unit.

8. The surgical access device of claim 7, wherein the zero seal is bonded, fused or over-molded with the septum seal.

9. The surgical access device of claim 1, wherein the tubular member, the septum seal and the zero seal are molded together or integrally formed as a single unit.

10. The surgical access device of claim 1, wherein the tubular member further comprises flexibility enhancing features to allow the tubular member to flex in response to a motion of a surgical instrument within the working channel of the tubular member.

11. The surgical access device of claim 10, wherein the flexibility enhancing features are formed around the distal end of the tubular member.

12. The surgical access device of claim 10, wherein the flexibility enhancing features are formed along the tubular member.

13. The surgical access device of claim 10, wherein the flexibility enhancing features provide a floating motion to the septum seal and the zero seal.

14. The surgical access device of claim 1, further comprising a second septum seal disposed at or near the proximal end of the tubular member.

15. The surgical access device of claim of claim 14, wherein the second septum seal provides leak protection in the event that the septum seal is over-stressed or damaged.

16. The surgical access device of claim 14, further comprising a second zero seal disposed at or near the proximal end of the tubular member distal to the second septum seal, wherein the second zero seal is being sized and configured to seal when
5 no instrument is in place within the working channel of the tubular member.

17. The surgical access device of claim 1, wherein the tubular member has at least one section that gradually tapers to facilitate placement of the access device through a body wall.

18. The surgical access device of claim 1, wherein the tubular member includes at least one region having a reduced wall section or thickness.

19. The surgical access device of claim 18, wherein the reduced thickness region is at or near the distal end of the tubular member.

20. The surgical access device of claim 1, further comprising a placement device for placing the access device.

21. The surgical access device of claim 20, wherein the placement device is an obturator operable to pierce or penetrate tissue.

22. The surgical access device of claim 20, wherein the placement device includes an elongate shaft having a proximal end, a mid-portion and a distal end.

23. The surgical access device of claim 20, wherein the proximal end includes a handle sized and configured to be held by a user.

24. The surgical access device of claim 20, wherein the mid-portion has a reduced profile and is sized and configured to extend through the tubular member.

25. The surgical access device of claim 20, wherein the distal end is shaped like an hourglass.

26. The surgical access device of claim 20, wherein the distal end comprises a tapered, cone-shaped member.

27. The surgical access device of claim 22, further comprising a venting lumen within the shaft of the placement device providing fluid communication between the distal end and the proximal end of the placement device.

28. The surgical access device of claim 20, further comprising an elastomeric shield member sized and configured to fit over the shaft of the placement device.

29. The surgical access device of claim 28, wherein as the placement device is withdrawn, the elastomeric shield member everts and is drawn into distal openings of the septum seal and the zero seal.

30. The surgical access device of claim 1, wherein the tubular member has a rigid or semi-rigid wall.

31. The surgical access device of claim 1, wherein the tubular member is reinforced with a coil along a portion of the tubular member.

32. The surgical access device of claim 31, wherein the reinforced portion terminates adjacent to a distal seal portion.

33. The surgical access device of claim 31, wherein the tubular member includes a distal, mechanically deployable shielding portion.

34. The surgical access device of claim 3, wherein the duckbill seal comprises opposing lip portions separated by a slit portion.

35. The surgical access device of claim 34, wherein the opposing lip portions are coated with or attached to a soft or occlusive material providing back pressure forcing the lip portions to close even when the duckbill seal is slightly open.

36. The surgical access device of claim 35, wherein the occlusive material is one of Kraton, polyurethane or the like.

37. The surgical access device of claim 35, wherein the occlusive lip portions allow a surgical item to extend through the slit portion without disrupting the seal.

38. The surgical access device of claim 37, wherein the surgical item is a surgical suture.

39. A method of placing a surgical access device across a body wall and into a body cavity, comprising the steps of:

providing the surgical access device having an elongate tubular member including a working channel and an axis extending between a proximal end and a distal end, a septum seal disposed at the distal end of the tubular member, and a zero seal disposed at the distal end of the tubular member distal to the septum seal, the zero seal

Docket No. A-3124-AL

being coupled to the septum seal and having properties for floating with the septum seal relative to the tubular member;

10 providing a placement device comprising an elongate shaft having a proximal end, a mid-portion and a distal end;

inserting the placement device into the working channel of the tubular member with the distal end of the placement device extending beyond the distal end of the tubular member; and

15 advancing the placement device and the tubular member through the body wall and into the body cavity.

40. The method of claim 39, further comprising the step of removing the placement device from the tubular member to open the working channel into the cavity.

41. The method of claim 40, further comprising the step of inserting a surgical instrument into the working channel of the tubular member to perform surgery within the cavity.

42. The method of claim 39, further comprising a rigid cannula having a proximal end and a distal end coaxially attached to the access device.

43. The method of claim 42, further comprising placing the septum seal and the zero seal in the cannula such that the septum seal and the zero seal extend distally from the distal end of the cannula.

44. A method for forming a one-piece surgical access device, said access device having an elongate tubular member including a working channel and an axis extending between a proximal end and a distal end, a septum seal disposed at the distal end of the tubular member, and a zero seal disposed at the distal end of the tubular member distal to the septum seal, the zero seal being coupled to the septum seal and having properties for floating with the septum seal relative to the tubular member, comprising the steps of:

placing the tubular member pre-form in a compression mold cavity having a proximal end and a distal end;

placing the septum seal pre-form in the distal end of the compression mold cavity; and

compressing the tubular member pre-form and the septum seal pre-form so as to mold said pre-forms into a preferred condition.

45. A method for forming a zero seal of a surgical access device, said access device having an elongate tubular member including a working channel and an axis extending between a proximal end and a distal end, a septum seal disposed at the distal end of the tubular member, and the zero seal disposed at the distal end of the tubular member distal to the septum seal, the zero seal being coupled to the septum

Docket No. A-3124-AL

seal and having properties for floating with the septum seal relative to the tubular member, comprising the steps of:

- 10 inserting slit-forming members into a mold core of the zero seal having lateral
extremities; and
sharpening the slit-forming members at the lateral extremities.

46. The method of claim 45, further comprising the step of tapering the slit-forming members at the lateral extremities to form an undercut slit or slit end portion.

47. The method of claim 46, further comprising the step of removing the core and slitting the terminal, lateral portion of the molded slit as the core is being removed.

48. A surgical access device, comprising:

an elongate tubular member having a working channel and an axis extending between a proximal end and a distal end;

- 5 a septum seal integrally formed at the proximal end of the tubular member; and
a zero seal disposed at the proximal end of the tubular member and distal to the septum seal, the zero seal being sized and configured to seal when no instrument is in place within the working channel of the tubular member, and the zero seal being coupled to the septum seal and having properties to float with the septum seal relative
10 to the tubular member.

Docket No. A-3124-AL

49. The surgical access device of claim 48, wherein the tubular member and the septum seal are molded together as a single unit.

50. The surgical access device of claim 49, wherein the zero seal is bonded or fused to the septum seal.

51. The surgical access device of claim 48, wherein the tubular member, the septum seal and the zero seal are molded together or integrally formed as a single unit.

52. The surgical access device of claim 48, wherein the tubular member is formed from an elastomeric material.